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Study of diversity of Calliphoridae flies from Renapur, District Latur (M.S.)

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Abstract :

The family calliphoridae includes Blow-flies belongs to the order Diptera. Flies in this family appear metallic reen in appearance. Some members of this family usually arrive within a few minutes of death. The blow flies specially the bluebottle and green bottle lay their eggs almost exclusively in dead or rotting flesh. Blow-flies are the irst insects attracted to a dead body within minutes of death. They are attracted by the organic odors of decomposition. Blow-flies have the ability to smell dead animal matter from up to ten miles (16 km) away. Upon reaching the arrion, females deposit eggs onto the body. Since development is highly predictable if the ambient temperature is nown, blowflies are considered a valuable tool in forensic science. Traditional estimations of time since death are ... rally unreliable after 72 hours and often entomologists are the only Officials capable of generating an accurate pproximate time interval. Collection of information about the composition and dynamics of the local communities of necrophagous arthropods in the area where the crime took place is essential to use forensic entomology effectively n legal investigations. Thus, it is not possible to use the data available in one region and apply it to the crime entomology in another region. Yet no research has been carried out in this area so present region is selected for the study.

Key words : Diversity, Calliphoridae, Forensic, Diptera, Entomologists.

Introduction :

Arthropods are most abundant creatures and found in almost every of habitat. Human remains are often found colonized by carrion-feeding invertebrates. The ubiquitous nature of insects makes their eventual appearance at a death scene technician to collect such material, especially with regards to the flies and beetles shall facilitate the search, recognition, and collection of insect specimens for evidence (Byrd, and Castner, 2001).

The forensic entomology can shed light on the "ground truth" and give a viable estimate, without bias, of the perpetrator's or suspect's past actions in human crimes. When studying entomology and methods by which insects breed, attack, escape, discover, or attract, we may continually ask ourselves whether the principles that govern deception use in nature apply to human conflict. (Albert, 2006).

Blow flies begin life as an eggs usually laid in large clusters on carrion, faces, or decaying material. In the flesh flies, the eggs are retained by the female until hatching. The small, first-instar larvae are then deposited directly on the food source. The young or maggots pass through three larva stages and are then ready to pupate. At this point, the mature maggots usually migrate away from the remains or food source to pupate in the soil. Sometimes, however, fly puparia can be found in the clothing of the deceased or under carpets or in furniture when in a house environment (Janson, 2000).

Blowflies, are usually the first organisms to arrive at a corpse, sometimes within minutes of death, and they are also the species of greatest forensic importance (Goff 2000; Byrd and Castner, 2001; Arnaldos et. al., 2005). A blow fly belongs to the family Calliphoridae and are commonly called bluebottles or greenbottles. Numerous species of blowfly exist and it is not unusual to find several species on a single corpse.

Materials and Methods :

The collection of the blowflies on the rotten liver and flesh of dog Caracas from different regions of Renapur was done. Partially putrefied liver/meat was exposed in the air and within few minutes the flies were attracted. The flies were collected by the insect collecting net and they were released in the insect rearing cages. Blow flies were brought to the laboratory maintained in cage under ideal laboratory condition. Rearing was important for identification purpose. Flies were identified by using the identification key of calliphorids and were confirmed from the Zoological Survey of India. Different life cycle stages of the blowflies were photographed to prepare

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the identification cards for ready reference so that by studying the stages and the species one can determine the period of the first visit of the blow fly. Two species of calliphorids were identified *Chrysomya megacephala* and *Lucilia cuprina*.

Results and Observation :

Two species of *calliphorids* were identified during present study namely *Chrysomya megacephala* and *Lucilia cuprina*.

Classification of *Chrysomya megacephala* (Fabricius, 1794)

Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Diptera
Family	Calliphoridae
Genus	*Chrysomya*
Species	C. *megacephala*

Characters of *Characters of Chrysomya megacephala* :

12 segments are present in the fully mature third instar with pointed anterior and blunt posterior end. Common name of *Chrysomya megacephala* is Oriental Latrine Fly. It appears greenish-blue, metallic box like body. Eyes are big bright and present in yellow gena. Cereus of the male is longer than that of the female. Thorax and abdomen are very large and large red eyes present on the on a head. 11-13 papillae are present in anterior spiracles of the third instar. At the caudal end, the presence of a pair of posterior spiracles is clearly visible. Peritreme is incomplete and heavily pigmented as a dark encircling three relatively straight spiraculer openings (slits), with the appearance of inward bent middle slits. Anterior and posterior thoracic spiracles observed dark brown in colour. Prostigmatic bristles are present on the thorax.

Classification of *Lucilia cuprina* (Wiedemann, 1830)

Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Diptera
Superfamily	Oestroidea
Family	Calliphoridae
Genus	Lucilia
Species	L. *cuprina*

Characteristics of *Lucilia cuprina* :

L. *cuprina* causes cutaneous myiasis or infestation. This not only causes severe discomfort or stress to the animal, but also causes death when left untreated. Body shape of *Lucilia cuprina* is round to oval. The larval body of L. *cuprina* is composed of 12 segments. appears green in color. Reddish eyes were observed. Th posterior spiracles were round with thick peritreme tha enclosed like a distinct button. Seven anterior spiracle were noted.

Discussion :

Insects developmental rate and succession pattern on the carrion differ from country to country and even from area to area within the different parts of the same country. Main reason behind this variation is the topography and environmental conditions. Therefore, it is impossible to apply the data available in one country and to any other country in the field of forensic entomology. A collection of information of insects developmental data as per region is mandatory for using insect evidence in criminal investigations.

As per the observation of this study egg of C. *megacephala* were oval with one flat and another convex side. Adult flies show a metallic blue-green colour on their thorax and abdomen. Eyes were large and red. Larval shape was thicker anterior side and thin towards the head. Male have large red eyes being close together and the females farther apart. Similar, results obtained by Byrd, and Castner, 2001.

Chrysomya megacephala is a warm-weather fly with a greenish-blue metallic box-like body which belongs to the family Calliphoridae (blowflies). This fly can be a nuisance to humans and even cause accidental myiasis (Brundage, 2009). C. *megacephala* contributes to the evolution of some insects, influences animal atmospheres, negatively alters human public health, and is a tool in forensic entomology.

When human remains are found, the most important questions usually are how, when, where and why the person died. Historically, determination of the postmortem interval (PMI) has been estimated through observation and measurement of body conditions such as core body temperature (Nelson, 1999), muscular flaccidity, rigor mortis, lividity, pallor of the skin and others (Smith, 1986; Bass, 2001; Byrd and Castner, 2001a). Entomological specimens in medicolegal death investigations are reliable indicators for estimating the PMI in both early and advanced stages of cadaver decomposition (Nuorteva, 1977; Smith, 1986; Goff, et. al., 1988; Kashyap and Pillay, 1989; Greenberg, 1991; Byrd, 1998).

The insect succession studies of the colonization patterns of insects in a particular area, often with the goal of obtaining data that can be applied to forensic investigations involving insects indicates that a death occurs in a similar environment (Kreitlow, 2009).

Two major groups of insects are predictably ttracted to cadavers and provide the majority of nformation in forensic investigation; the flies and he beetles (Castner, 2001). This study focused on the amily Calliphoridae, commonly called the blow flies, which are the first to find and colonize human corpses. Experimental studies indicated that these flies arrive at carcasses within minutes of their exposure (Shean,et. al., 1993; Byrd and Castner, 2001).

This research is important in the field of forensic entomology. As it is the application of arthropod science in the judicial system. Forensic entomologist assist in criminal cases by estimating the time of insect colonization of human or other animals (Keh, 1985). Forensic entomologists mainly rely on laboratory developmental data in order to make these estimates. Colonization of the arthropods occurs soon after the death of an animal. These estimates are synonymous with the m PMI. The d for development data is necessary, as they might e significantly different from each species as well as various environmental conditions (Tarone and Foran, 2006, Boatright and Tomberlin, 2010).

Conclusion :

Two species of the calliphorid flies were collected on the decaying meat in the Renapur region and were identified as *Chrysomya megacephala* and *Lucilia cuprina*. The rates of insect development and their pattern of succession on the carrion differ from country to country and even from area to area within the same country, mainly because of the variation in the topography and climate or weather. Thus, it is not possible to use the data available in one country and apply it to the crime entomology in another country. Collection of information about the composition and dynamics of the local communities of necrophagous arthropods in the area where the crime ook place is essential to use entomology effectively in gal investigations.

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